# SYSTEM AND METHOD FOR MATCHING AN OFFER WITH A QUOTE

## FIELD OF THE INVENTION

The present invention relates to electronic commerce. More specifically, the invention relates to the purchase of travel services, such as airfare, in an electronic exchange transaction.

## BACKGROUND OF THE INVENTION

More and more people are purchasing goods and services electronically, such as over the Internet. Electronic exchange systems are achieving widespread use in the area of travel arrangements. These systems provide an outlet for suppliers having surplus inventory, and often allow consumers to obtain desired goods or services at below-market rates. One such system of electronic exchange is used by "online travel service exchangers" and allows customers to place an offer for travel services, such as airfare or airline accommodations. However, existing online travel service exchangers suffer from various problems. For instance, existing systems do not allow individual travel service providers to better their chances at being selected as the winner of the offer. One reason is that existing online travel service exchangers satisfy a consumer's offer by simply querying a list of providers to determine whether one or more are willing to accept the consumer's offer. The first

provider that satisfies the offer is selected and the offer is matched. Travel service providers are not incentivized to offer more-attractive rates that will increase the likelihood that a customer offer will be accepted.

5      In addition, existing schemes charge a purchaser the value of the purchaser's offer even if that value exceeds what the purchaser would have paid without the aid of the electronic travel service system. In other words, even if the purchaser's offer exceeds a published rate for the travel services, existing

10     schemes punish the purchaser by charging her the full value of the offer.

An effective electronic exchange system for matching an offer by a consumer with a quote from a travel service provider has eluded those skilled in the art.

## SUMMARY OF THE INVENTION

Briefly stated, the present invention provides a system that matches customer's offers for travel services with quotes from providers of those travel services in a way that allows providers

20     to negotiate preferential treatment. The travel service exchanger first assigns providers to one of two provider groups: a preferred provider group and a non-preferred provider group. Within the preferred provider group, each of a plurality of providers is assigned a ranking. The preferred provider status,

25     and the ranking assigned to each preferred provider within the

preferred provider group, may be negotiated between the travel service exchanger and the individual providers. Each ranking may correspond to slightly different criteria with respect to pricing, availability requirements, profit margins, and various

5   other criteria. The non-preferred providers may be grouped together with no particular ranking, but they may also be ranked according to some negotiated agreement or some other criteria.

When a customer offer is received, the travel service exchanger may attempt to satisfy the customer offer from

10   published fares (e.g., "rack rates") for the desired travel services. For example, a customer's offer for airfare between two cities at a certain price may be higher than a rate at which the customer can purchase the airfare without the aid of the electronic exchange process. In that case, the travel service

15   exchanger acts as an electronic travel agent, and satisfies the customer's offer without resorting to the preferred or non-preferred groups and charges the customer the published rate (rather than the full value of the offer). In the more common situation where the customer offer is below the published fares,

20   the travel service exchanger requests rate information from the highest-ranked provider in the preferred provider group for the travel services identified in the customer offer. The highest-ranked provider may return one or more fares. The travel service exchanger compares the fares returned by the highest-ranked

25   provider to the customer offer. If the offer can be satisfied by

the highest-ranked provider, then the offer is matched with the highest rate supplied by the highest-ranked provider and the airfare is booked. If the offer cannot be satisfied by any of the fares supplied by the highest-ranked provider, then the

5    travel service exchanger moves to the next-highest ranked provider and repeats the request. The request is made to each preferred provider, in order of preference, until either the customer offer is satisfied, or the preferred provider group is exhausted, meaning that none of the preferred providers were able

10   to satisfy the customer offer within the constraints of the preferential rankings.

If customer offer is not satisfied by the preferred providers, the travel service exchanger moves to the non-preferred provider group. The travel service exchanger then

15   issues requests to each non-preferred provider for fares on the travel services described in the customer offer. The travel service exchanger then selects a rate from those returned as a match for the customer offer. The travel service exchanger may base the selection of a matching rate on the lowest rate, the

20   least restrictive rate, the highest rate that still affords the travel service exchanger a reasonable profit, a random selection, or any other criteria. It should be noted that the fares supplied by the preferred providers, although not satisfying the constraints of the preferential treatment, may still be used in

25   the non-preferred provider analysis. In addition, when

evaluating whether a rate satisfies the customer offer, the
travel service exchanger includes the actual taxes that will be
imposed on the purchase transaction to ensure that the customer
is not surprised by a charge that exceeds the customer offer

5   because of taxes.  Finally, if a satisfactory rate is selected,
the travel services are booked with the corresponding service
provider.

These and other aspects of the invention, together with the
benefits and advantages realized, will become apparent from a
10  reading of the following detailed description in conjunction with
the drawings, in which:


## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram representing a typical computer
system into which one implementation of the present invention may
be incorporated;

Figure 2 is a functional block diagram generally
illustrating one implementation of an online travel service
exchanger system constructed in accordance with the present
20  invention;

Figure 3 is a functional block diagram generally
illustrating one implementation of an online travel service
exchanger of the system illustrated in Figure 2;

Figure 4 illustrates, in tabular format, one example of the type of information that may be stored within a customer database employed in one implementation of the present invention;

Figure 5 illustrates, in tabular format, one example of the type of information that may be stored within an airline database employed in one implementation of the present invention;

Figure 6 illustrates, in tabular format, one example of the type of information that may be stored within an offer history database employed in one implementation of the present invention;

Figures 7-9 are sample screen displays that may be presented to a customer when interfacing with one implementation of the present invention;

Figure 10 is a logical flow diagram generally illustrating a process performed by one implementation of the present invention to match an offer from a customer with a quote from one or more providers;

Figure 11 is a logical flow diagram generally illustrating the functions performed by one implementation of the present invention to receive customer offer information;

Figure 12 is a logical flow diagram that generally illustrates a process performed by one implementation of the present invention to attempt to book airfare with one of a group of preferred airlines;

Figure 13 is a logical flow diagram that generally illustrates a process performed by one implementation of the

present invention to attempt to book airfare with one of a group

of non-preferred airlines;

Figure 14 is a logical flow diagram generally illustrating a

process performed by one implementation of the present invention

5  to book accommodations with a airline having been identified as a

winner by one implementation of the present invention.


## DETAILED DESCRIPTION

One illustrative system constructed in accordance with the

10  present invention may be implemented as an electronic travel

services broker. The several components of the illustrative

system are described first, followed by a description of the

operation of the system through the interaction of the several

components. The illustrative system described is but one of many

15  alternative electronic exchange purchase transactions that can be

implemented in accordance with the present invention, and the

breadth and scope of the invention is not limited to the

particular embodiments described here.


20  Exemplary Computing Device

Figure 1 is a functional block diagram generally

illustrating a computing device 100, one or more of which may be

adapted for use in the illustrative system for implementing the

invention. The computing device may be, for example, a personal

25  computer, a handheld device such as a cell phone or a personal

digital assistant, multi-processor systems, microprocessor-based

or programmable consumer electronics, network PCs, minicomputers,

mainframe computers and the like. The invention may also be

practiced in distributed computing environments where tasks are

5    performed by remote processing devices that are linked through a

communications network. In a distributed computing environment,

program modules may be located in both local and remote memory

storage devices.

In its most basic configuration, computing device 100

10   typically includes at least one processing unit 102 and system

memory 104. Depending on the exact configuration and type of

computing device, system memory 104 may be volatile (such as

RAM), non-volatile (such as ROM, flash memory, etc.) or some

combination of the two. The basic configuration of the device

15   100 is illustrated in Figure 1 within dashed line 106.

Device 100 may also have additional features and

functionality. For example, device 100 may also include

additional storage (removable and/or non-removable) including,

but not limited to, magnetic or optical disks or tape. Such

20   additional storage is illustrated in Figure 1 by removable

storage 108 and non-removable storage 110. Computer storage

media includes volatile and nonvolatile, removable and non-

removable media implemented in any method or technology for

storage of information such as computer readable instructions,

25   data structures, program modules, or other data. System memory

104, removable storage 108, and non-removable storage 110 are examples of computer storage media. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD)

5 or other optical storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store information and which can be accessed by device 100. Any such computer storage media may be part of device 100.

10 Device 100 includes one or more input devices 112 such as a keyboard, mouse, pen, puck, voice input device, touch input device, scanner, or the like. One or more output devices 114 may also be included, such as a video display, audio speakers, a printer, or the like. Input and output devices are well known in

15 the art and need not be discussed at length here.

Device 100 also contains communications connection 116 that allows the device 100 to communicate with other devices 118, such as over a local or wide area network. Communications connection 116 is one example of communication media. Communication media

20 includes any information delivery media that serves as a vehicle through which computer readable instructions, data structures, program modules, or other data may be delivered on a modulated data signal, such as a carrier wave or other transport mechanism. The term "modulated data signal" means a signal that has one or

25 more of its characteristics set or changed in such a manner as to

encode information in the signal. By way of example, and not
limitation, communication media includes wired media such as a
wired network or direct-wired connection, and wireless media such
as acoustic, electromagnetic (e.g., radio frequency), infrared,
5    and other wireless media. The term computer readable media as
used herein includes both storage media and communication media.


Illustrative Electronic Travel Agent System

         Figure 2 is a functional block diagram generally
10    illustrating one implementation of an electronic travel service
exchanger system (the system 200) constructed in accordance with
the present invention. The system 200 is constructed to aid a
customer to purchase a product, such as travel goods or services,
in an electronic exchange transaction. The system 200 may be
15    implemented as software modules or components stored and
executing on one or more computing devices, such as that
illustrated in Figure 1. The system illustrated in Figure 2 and
described here is but one of the many implementations that will
become apparent by the teachings of the present invention.

20       The system 200 includes a customer machine 201, an online
Travel service exchanger (OTSE) 202, an availability
determination component 203 (e.g., a Global Distribution System),
and a network 204 of travel service providers, such as airlines
that have agreed to participate in the system 200. Although well
25    suited for use in conjunction with an airline network 204, this

implementation of the invention has equal applicability to other

provider networks and the airline network 204 is offered only as

one example.  As described below, each of these components may  .

include one or more computing devices, such as the computing

5   device 100 described above.  Moreover, each of the components may

be interconnected over a wide area network, such as the Internet

206.  Although the following discussion will make reference to

the Internet 206 as a specific wide area network, those skilled

in the art will appreciate that any mechanism for connecting

10   multiple computing devices may equally be used.

The customer machine 201 is a computing device connected to

the Internet 206 over a network connection 208, such as a dial-up

modem connection, a coaxial cable connection, a digital

subscriber line connection, or the like.  The customer machine

15   201 may be adapted to interact with other computing devices over

the Internet 206 through the use of browsing software 205.  The

browsing software 205 may be integrated into an operating system

executing on the customer machine 201.  Via the browsing software

205, a customer of the customer machine 201 may retrieve Web

20   pages or other documents from other computing devices attached to

the Internet 206, and may additionally provide information to

those other computing devices.

The Global Distribution System (GDS) 203 is a central

repository of fare and availability information for the airlines

25   in the airline network 204.  The GDS 203 may interface with other

computing devices connected to the Internet 206 via network

connection 214. If it is connected to the Internet 206, the GDS

203 may include information server software 216 for managing

transactions with other computing devices over the Internet 206.

5   The GDS 203 may include and maintain a data store 218 that

contains the fare information associated with each airline in the

airline network 204. As will be appreciated by those in the art,

the GDS 203 may store fare information for both public fares

(e.g., those made available to the general public), and private

10  fares (e.g., special fares negotiated between individual airlines

and brokers, such as the OTSE 202).

The GDS 203 is adapted to place queries to each airline in

the airline network 204 and receive current fare information from

those airlines, and to store that information in the data store

15  218. The GDS 203 may make that information available to entities

interested in booking travel arrangements, such as the OTSE 202.

Moreover, the GDS 203 is adapted to make reservations with

airlines in the airline network 204 upon request by those

entities. The use of a global distribution system, such as the

20  GDS 203, to transact with airlines is generally known in the art.

It should be appreciated that each airline in the airline network

204 may be connected to and interface with the GDS 203 in a

conventional manner to upload fares and download booking and

ticketing information. Examples of such global distribution

systems in common use today are Worldspan, SABRE, Galileo, and Amadeus.

One or more airlines in the airline network 204 may be connected to the Global Distribution System (GDS) 203 over the Internet 206, via network connection 210. Alternatively, one or more airlines may be directly connected to the GDS 203, such as through a dedicated network connection 212. In addition, one or more airlines may directly connect to the OTSE 202 via a dedicated network connection 213.

The airline network 204 includes two groups of airlines: a preferred airlines group 207 and a non-preferred airlines group 209. Each of the preferred airlines 207 is assigned a distinct preference. As will be discussed in detail later, the preferences provide a mechanism by which an airline may increase its likelihood of being selected as a match for the customer's offer. More particularly, the preferences are used by the OTSE 202 to determine the order in which quotes are requested from the airlines in the airline network 204. The preference may be negotiated between the particular preferred airlines 207 and the entity responsible for maintaining the OTSE 202. For example, in order to better its chances of being selected as a match for the customer's offer, an airline may agree to guarantee an acceptable profit margin to the OTSE 202. The preference assigned to each preferred airline may reflect the amount of guaranteed profit

margin negotiated by each preferred airline (e.g., those airlines guaranteeing lower profit margins are granted lower preferences).

As another example, preferences may be assigned according to particular airlines' market share. That is, airlines are chosen based upon a round robin scheme where an airline having X percent of market share is given most-preferred status X percent of the time. Alternatively, the market share of the airline may be factored into a scheme for deciding preference. In another example, an airline may be given regional or geographical preferencing. Many alternatives are contemplated, including but not limited to providing preferred airlines alphabetically, contractually, or randomly.

The non-preferred airlines group 209 constitutes those airlines that provide the OTSE 202 with private fares (e.g., fares below the public published fares) but choose not to negotiate preferential treatment. In other words, the non-preferred airlines 209 accept a lower chance of being selected in exchange for not providing fare guarantees to the OTSE 202.

The OTSE 202 includes one or more computing devices, such as that illustrated in Figure 1, and is connected to the Internet 206 through a network connection 220. The OTSE 202 optionally may be connected to the GDS 203 through a dedicated network connection 221. The OTSE 202 is illustrated in greater detail in Figure 3 and described below. Generally described, the OTSE 202 includes a Web server component 222, a travel server component

224, and a data store 228. Although illustrated in three components, those skilled in the art will appreciate that the functions of each described component may be merged into fewer components, or similarly, distributed among more components. The use of three illustrative components is for simplicity of discussion only, and should not be viewed as an exclusive list of possible components.

Briefly described, the OTSE 202 interfaces with the customer machine 201 and the GDS 203 to administer an electronic exchange purchase transaction. As described in greater detail below, the OTSE 202 receives an offer from the customer machine 201, via the Internet 206, for travel services, such as an airline ticket. The OTSE 202 attempts to satisfy the customer's offer by retrieving from the GDS 203 one or more quotes for the identified travel services. Rather than merely requesting quotes from randomly selected airlines, the OTSE 202 first requests quotes from one preferred airline at a time in descending order of preference until the offer is satisfied. If no preferred airline satisfies the offer, the OTSE 202 may request quotes from a group of non-preferred airlines in the airline network 204. The OTSE 202 then satisfies, if possible, the offer with one of the quotes from the non-preferred airlines.

Figure 3 is a functional block diagram generally illustrating one implementation of the OTSE 202.. As mentioned above, the OTSE 202 includes a Web server component 222, a travel

server component 224, and a data store 228. The data store 228 of the described embodiment contains various types of information used by the different components of the OTSE 202. For instance, the data store 228 includes a customer database 305 that is used

5    to store information related to customers that use the OTSE 202 to book travel arrangements. Figure 4 illustrates, in tabular format, one example of the type of information that may be stored within the customer database 305. Referring briefly to Figure 4, a table 401 includes a record for each customer of the OTSE 202.

10   Each record may include a customer identifier 403, authentication information 405 for the customer (such as a password), an email address 407 for the customer, and other information 409 associated with the particular customer.

The data store 228 also includes an airline database 307 that contains information about each airline in the airline

15   network 204. In particular, the airline database 307 may identify each of the airlines in the airline network 204 and identify whether they are preferred airlines 207 or non-preferred airlines 209. Further, the airline database 307 may include the

20   particular preferences associated with each of the preferred airlines 207.

The airline database 307 is used by the travel server 224 to identify the airlines from which to request a quote in response to an offer from the customer machine 201. Figure 5 illustrates,

25   in tabular format, one example of the information that may be

stored within the airline database 307. Referring briefly to
Figure 5, a table 501 includes a record for each airline in the
airline network 204. Each record includes an airline identifier
(e.g., a carrier code) 503 that uniquely identifies each airline
5    in the airline network 204. The record also identifies, in the
preferred column 505, whether the corresponding airline is a
member of the preferred airlines group 207 or the non-preferred
airlines group 209. If the corresponding airline is a preferred
airline, the record includes, in the preference column 507, the
10   particular preference associated with the corresponding airline.
For example, if there are five preferred airlines in the
preferred airlines group 207, the preference column 507 may
include a number from one to five, a letter from A to E, or any
other indicator of the relative preferences of the preferred
15   airlines 207. Moreover, for those airlines designated as
preferred, the airline database 501 may include a preferred
criteria column 508 that includes criteria for determining
whether the preferred airline matches the offer. For example, if
a particular criterion, such as an acceptable profit margin to
20   the OTSE 202, had been negotiated by the most preferred airline,
that criteria may be stored in the preferred criteria column 508
corresponding to the most preferred airline. In that way, the
OTSE 202 may evaluate whether an offer provided by a preferred
airline satisfies the criteria. Other information 513 associated

with the corresponding airline may also be included in the other information column 509.

Returning to Figure 3, the data store 228 also includes an offer history database 309, which contains the storage information related to offers provided to the OTSE 202 by various customers. As described in greater detail below, the offer history database 309 may be used by the travel server 224 to prevent customers from recursively submitting offers on the same travel services in an attempt to identify the lowest possible price point at which an offer may be matched. Figure 6 illustrates, in tabular format, one example of the information that may be stored within the offer history database 309. Referring to Figure 6, a table 601 includes a record for each offer provided to the OTSE 202. Each record includes an offer identifier 603 to uniquely identify the offer, and a customer identifier 605 of the customer that provided the offer. The customer identifier 605 may be the customer identifier 403 (Figure 4) or some other mechanism to uniquely identify the customer, such as an e-mail address, IP address, or the like. The table 601 also includes a column of information used to purge stale records from the offer history database 309. In the described example, a record for an offer is purged from the offer history database 309 after a predetermined amount of time (e.g., 24 hours) has elapsed since the offer. Toward that end, a time column 607 may reflect the time when the corresponding offer was

made. Other offer information 609 may also be included in the offer history database 309.

Returning once again to Figure 3, other files 311 may also be contained within the data store 228. For instance, HTML and

5 XML files served by the Web server 222 may be contained within the data store 228 for use in constructing user interface screens as will be described later. Other information may also be stored on the data store 228.

The Web server component 222 of the OTSE 202 controls the

10 interface between the OTSE 202 and the customer machine 201. The Web server 222 includes a user interface component 303 configured to assemble and serve Web pages over the Internet 206 to various computing devices, such as the customer machine 201. The user interface 303 may also receive information provided by

15 interacting with those Web pages. Thus, the user interface 303 may make information received from the customer machine 201 available to the Web server 222, which may in turn make that information available to other components of the OTSE 202, such as the travel server 224.

20 The travel server 224 is configured to access the airline database 307 when an offer is provided to it by the Web server 222. Based on the parameters provided with the offer, the travel server 224 accesses the airline database 307 to identify potential airlines within the airline network 204 that may

25 satisfy the offer. It should be noted that the travel server 224

need not contact the airlines directly or the GDS 203 to identify airlines that may potentially satisfy the offer. Rather, sufficient information about the participating airlines in the airline network 204 is stored locally within the airline database

5    307. The travel server 224 is also configured to interface with the GDS 203 to query for fares and availability provided by the airlines selected from the airline database 307. The travel server 224 may also be configured to make airline reservations with the GDS 203.

## Illustrative User interface Screens

Figures 7-9 are sample screen displays that may be presented to a customer of the customer machine 201 when interfacing with the OTSE 202. Each of the sample screen displays represents one or more HTML or XML pages assembled and served by the user interface component 303 of the Web server 222, as interpreted and rendered by the Web browsing software 205 of the customer machine 201. The sample screen displays may be used by the system 200 to provide information to and receive information from

20   the customer machine 201. The sample screen displays are provided as examples only, and the particular layout of the sample screen displays are not critical to a proper functioning of the invention.

Figure 7 is a graphical representation of an initial screen

25   display 701 presented to a customer to begin the offer process.

In this screen display 701, the customer is prompted with a departure field 702 so that the customer may identify from what city or airport the customer wishes to begin the travel. The customer is also prompted with a destination field 703 so the

5      customer can identify the destination of the travel, such as a particular city or airport. In this implementation, the departure field 702 and the destination field 703 are configured to receive alphanumeric indicators of either the names of the respective cities or airport codes that are commonly used to

10     identify particular airports around the world.

The customer is also prompted with a departure field 705 and a returning field 707 which together allow the customer to define the desired travel dates. Additionally, the customer may be prompted with travelers fields 709 to identify the number of travelers that fall into certain age groups. The customer may be prompted with a connections field 711 to identify a maximum number of stops that the customer is willing to make while traveling. And finally, in this screen display 701, the customer is prompted for an offer value 713 that identifies the maximum

20     amount that the customer is willing to pay (per traveler) for the airfare. It should be noted that the amount entered in the offer value field 713 will be the total amount charged to the customer upon a successful quote selection, as opposed to the prior practice of adding taxes and the like to the offer value before

25     charging the customer. Optionally, the initial screen display

701 (or any other screen display) may provide the customer with an option of identifying particular airlines that the customer deems to be undesirable, and which should be avoided during the electronic exchange match selection. By activating the next

5  button 715, the customer causes the information provided in the several fields on the initial screen display 701 to be posted to the Web server 222, where it is stored in the data store 228. Activating the next button 709 may also cause the user interface component 303 to transmit to the customer machine 201 a traveler

10  identification screen display.

Figure 8 is a graphical representation of a traveler identification screen display 801. In this embodiment, the traveler identification screen display 801 prompts the customer to provide personal information about the travelers identified in

15  the previous screen. In particular, the customer may be prompted to provide a last name 803, a first name 805, and phone numbers 807 for each identified traveler. A special assistance field 809 may be provided to allow the customer to identify whether the traveler is in need of special assistance while traveling. In

20  addition the customer may be prompted to provide contact information 811 in case of an emergency.

The OTSE 202 may require the customer to create an account prior to continuing with the offer matching process. For instance, the traveler identification screen display 801 may

25  include fields, such as a member ID field 813 and a password

field 815, that allow the customer to either create a new account or login to an existing account. A check box 817 may allow the customer to have the password 815 stored on the customer machine 201 to avoid having to retype the password later. Moreover, an

5    e-mail field 819 may prompt the customer for an e-mail address associated with the account and to which confirmation may be transmitted. By activating the next button 821, the customer causes the information provided in the several fields on the traveler identification screen display 801 to be posted to the

10   Web server 222, where the information is stored in appropriate locations, such as the customer database 305, or used to verify the customer's account. Activating the next button 821 may also cause the user interface component 303 to transmit to the customer machine 201 a verification screen display.

Figure 9 is a graphical representation of a verification

15   screen display 901. The verification screen display 901 may be generated by the user interface component 303 of the Web server 222 based on information provided through the other screen displays. For example, the Web server 222 (Figure 3) may

20   retrieve from the data store 228 the information provided on the initial screen display 701 and summarize that information in a summary field 903. The summary field 903 may provide the offer amount, the city pair, and the dates of travel for verification by the customer.

The verification screen display 901 may additionally prompt the customer for credit card information, such as a credit card type 905, credit card number 907, and expiration date 909. A check box field 911 may be provided to allow the customer to have

5 the credit card information stored for future use, such as on the data store 228 or locally on the customer machine 201. A billing address field 911 may be used for credit card validation, and a delivery address field 913 may be used to identify where to deliver the tickets if purchased. Again, by activating the next

10 button 915, the customer causes the information provided in the several fields on the verification screen display 901 to be posted to the Web server 222, where the information is stored and may possibly be verified. Activating the next button 999 may also cause the user interface component 303 to transfer control

15 to the travel server 224 to proceed with the current offer transaction.

In summary, the preceding discussion has been directed to describing the configurations and functions of each of the several components, data structures, and subsystems of the online

20 travel service exchanger system generally depicted in Figure 2. The following discussion is presented as a detailed description of the interactions of the described components, data structures, and subsystems through processes performed in accordance with implementations of the invention.

25

Operation of an Exemplary Electronic Exchange Matching System

Figures 10-15 are logical flow diagrams that generally illustrate several processes performed by the illustrative online travel service exchanger system illustrated in Figures 2-9 and described above. The general and specific operation of the system 200 is illustrated through the several flow diagrams described below, with reference to the components of the system described above and illustrated in Figures 2-9. For ease of description, the flow diagrams disclose one embodiment of the operation of the present invention. However, it can be understood that different processes and/or different chronological orders may be implemented within the spirit of the present invention.

Figure 10 is a logical flow diagram generally illustrating a process performed by the system 200 to match an offer from a customer with a quote from one or more travel service providers. The process begins at step 1003, where the system 200 receives customer offer information. The operations performed at step 1003 are illustrated in detail in Figure 11 and described below. Briefly described, the customer provides sufficient information for the system 200 to initiate the offer matching process. For example, in the described embodiment, the customer identifies at least an offer price and a description of the travel services, such as a travel city pair and dates of travel. In addition, the system 200 may request payment (e.g., credit card) information

from the customer prior to proceeding with the offer process.
Once the information is received, the process continues to step
1005.

At step 1005, the system 200 attempts to book the travel

5   services with the preferred airlines.  Briefly described, the
system 200 attempts to book the requested travel services with
each preferred airline, beginning with the most preferred, until
either there are no more preferred airlines or until an
acceptable fare is found.  As can be understood, when the system

10  200 attempts to book the travel services, the quotes supplied by
the providers are not shown to the user.  The operations
performed at step 1005 are illustrated in detail in Figure 12 and
described below.  If none of the preferred airlines provide an
adequate quote that satisfies the customer's offer, then, from

15  decision step 1007 the process continues to step 1009.

At step 1009, the system 200 attempts to book the travel
services with one of the non-preferred airlines.  In an alternate
embodiment, the system may also at this time try to book travel
services with a preferred airline that does not meet the

20  preferred criteria.  That is, the fares from a preferred airline
that were not acceptable for booking in step 1005 may be
considered in step 1009 in the same consideration process given
to the non-preferred airlines.  In any event, the operations
performed at step 1009 are illustrated in detail in Figure 13 and

25  described below.  Briefly described, the system 200 issues

requests to one or more of the non-preferred airlines (or

preferred airlines fares that do not meet the preferred criteria

as described above) for fares that correspond with the offer

information (e.g., the travel city pair and travel dates).  The

system 200 then selects the lowest of the returned fares that

satisfies the customer's offer.  If none of fares satisfy the

customer's offer, then, from decision step 1011 the process

returns a failure indicating that the customer's offer was not

accepted.  If, however, an acceptable fare is returned, the

system 200 selects that fare as the winning fare.  If more than

one acceptable fare is returned, the system 200 may select the

lowest of the acceptable fares.  At step 1013, the winning fare

is booked with the corresponding airline.  The operations

performed at step 1013 to book the fare are illustrated in detail

in Figure 14 and described below.

It should be noted that, unlike previous systems where the

customer may be charged taxes in addition to the offer amount,

with the current system an estimate is made of any taxes that may

be applicable to the particular travel services requested.  The

estimated taxes are then added to the evaluated fares to ensure

that the amount charged to the customer's credit card does not

exceed the offer amount.  Once the customer has been charged, and

appropriate notifications given, the process illustrated in

Figure 10 terminates.

Figure 11 is a logical flow diagram generally illustrating the operations performed at step 1003 of the process illustrated in Figure 10 to receive customer offer information. The process of Figure 11 begins at step 1103, where the customer is prompted

5 for information about the customer's travel plans, in particular the travel destination (e.g., a city) and the dates of travel. For example, the customer may be presented with the initial screen display 701 illustrated in Figure 7 and described above.

At step 1105 the customer is prompted to identify the

10 individuals for whom the travel services are being offer. Toward that end, the OTSE 202 may present to the customer the traveler identification screen display 801 illustrated in Figure 8 and described above. The customer may be prompted to provide names and ages for each individual traveling. In addition, the

15 customer may be required by the OTSE 202 to create or login to an account.

At step 1109, the customer is prompted to verify that the information thus far provided is accurate, and to confirm the offer transaction. For instance, the OTSE 202 may present the

20 customer with the verification screen display illustrated in Figure 9 and described above. As part of the verification, the customer may be prompted to provide payment information, such as a credit card number, prior to proceeding. If the customer indicates that the offer information is incorrect, then, from

25 decision step 1113, the process returns to step 1103 where the

customer is prompted to provide the offer information again. If the customer verifies the offer information, the process proceeds to step 1117 where the payment information is stored, and the process returns to Figure 10. Alternatively, if an error occurs

5    (e.g., failure of the credit card number) during the verification process, an error handling procedure may be implemented.

Figure 12 is a logical flow diagram generally illustrating a process performed to attempt to match the customer's offer with one of the preferred airlines. The process begins at step 1203,

10   where the OTSE 202 identifies the most preferred airline from the group of preferred airlines 207. To make that identification, the travel server 224 may query the records within the airline database 307. Once the most preferred airline is identified, the process proceeds to step 1205.

15   At step 1205, a request is sent to the GDS 203 for fares associated with the most preferred airline. The request includes the carrier code associate with the most preferred airline and the offer information, including the city pair and the travel dates. The request may additionally include a rate code that

20   indicates that special pricing is being requested on behalf of the OTSE 202. When the GDS 203 returns the fares, the process continues at step 1207.

At step 1207, the OTSE 202 evaluates the fares returned to determine whether one or more of the fares satisfies the offer.

25   It should be noted that the airline may return many, even dozens,

of possible fares associated with the offer information. In that case, the system 200 selects the highest fare provided that still satisfies the preferred criteria 508 for the particular airline (stored in the airline database 307) and returns success to the process illustrated in Figure 10 and described above. However, if none of the fares returned by the most preferred airline satisfies the preferred criteria 508, the process continues to decision step 1211.

As is described above, the preferred criteria is optional, and may only be needed in a situation in which the preferred airline has negotiated preferred status based upon an amount of the price that the airline is willing to forego in order to procure preferred status. If other methods are used to procure preferred status (e.g., market share or geographical preferences as described above), then an offer may be satisfied by comparing the price of the airfares provided by the preferred airline against the offer, with any adjustments needed for desired profit for the OTSE 202.

In any event, at decision step 1211, a determination is made whether there remain more preferred airlines that have not yet been requested to satisfy the customer's offer. If there are no more, then the process returns a failure to decision step 1007 of the flow diagram illustrated in Figure 10. Otherwise, at step 1215, the travel server 224 takes the next-most preferred airline and returns to step 1205, where fares are requested from that

airline. The process illustrated in Figure 12 continues until either an acceptable fare is provided, or until the group of preferred airlines is exhausted.

Figure 13 is a logical flow diagram generally illustrating a process performed to attempt to book travel services that satisfy the customer's offer with a non-preferred airline. The process begins at step 1303, where a request for fares is issued to the GDS 203 for each non-preferred airline. Those skilled in the art will appreciate that each request may be issued by the travel server 224 to the GDS 203 in the form of a message including the airline identifier (carrier code) 503 and a rate plan code. The airline identifier 503 identifies the particular airline from which availability and fares are requested, while the rate plan code indicates to the GDS 203 that specially negotiated fares are being requested. The request additionally includes other offer information such as the dates of travel and city pair. A separate request may be issued for each non-preferred airline.

At step 1305, the travel server 224 may select from those fares returned by the several non-preferred airlines a lowest fare that satisfies the customer's offer. In other words, if the customer's offer could not be satisfied by the preferred airlines in accordance with the preferred criteria associated with the particular preferred airline, then the lowest returned fare may be selected from the non-preferred airlines. As noted above, fares supplied by the preferred providers, although not

satisfying the constraints of the preferential treatment, may

still be used in the non-preferred provider analysis. In that

case, the fares provided by the preferred airlines are evaluated

against the non-preferred airlines without regard to the

5    preferred criteria. If an acceptable fare is identified, the

process returns success to step 1009 of the flow diagram

illustrated in Figure 10. Otherwise, if an acceptable fare is

not identified, the process returns failure to step 1009 of the

flow diagram illustrated in Figure 10.

10       Figure 14 is a logical flow diagram generally illustrating a

process performed by the travel server 224 to book the selected

fare. At decision step 1403, a determination is made whether the

selected fare is higher than the winning airline's published fare

for the travel services. Decision step 1403 is essentially a

15   customer-protection reality check to ensure that customers are

not charged for airfare through the system 200 in excess of what

would be charged having gone through conventional travel

arrangements. If the selected fare is above the published fare,

then, at step 1405, the published fare is selected for booking

20   and the process continues to step 1407. Otherwise, the currently

selected fare remains the selected fare and the process continues

to step 1407.

At step 1407, the travel server 224 attempts to book the

airfare with the GDS 203 at the selected fare. If, at decision

25   step 1409, the travel server 224 is successful at booking the

accommodations at the selected fare, the process continues to

step 1417, where the customer is charged for the airfare. It

should be noted that the customer is either charged the offer

value, or the published fare, depending on which is lower. The

5    process then returns success to step 1013 illustrated in

Figure 10. However, if the travel server 224 fails to

successfully book the accommodations (e.g., an airline providing

a fare quote may respond that it no longer has availability at

that fare), the process continues to step 1410.

10    At step 1410, the travel server checks to see if the

preferred airline has other fares that are available. If so,

then step 1410 loops back to step 1407, where the travel server

attempts to book the other airfare. If there are not any other

fares available from the preferred airline, then step 1410

15    branches to step 1411, where the winning airline is eliminated as

a possible match for the offer. Then, at step 1413, the process

returns to step 1005 of Figure 10, where the process repeats to

select another acceptable airline.

If desired, a time-out mechanism may be utilized to prevent

20    a search for an individual from utilizing too many server

resources. For example, the travel server may define a ten-

minute limit for a search. The time-out may be treated as a

failed search or may be handled in another manner as appropriate.

Although the system chosen to describe the present invention

25    is an online travel service exchanger system, those skilled in

the art will appreciate that many other types of electronic

exchanges may benefit equally from the present invention.

Moreover, the described implementations of the invention are

susceptible to various modifications and alternative

5    constructions.  It should be understood, that there is no

intention to limit the invention to the specific form or forms

disclosed, but on the contrary, the intention is to cover all

modifications, alternative constructions, and equivalents falling

within the spirit and scope of the invention.